

Remarks

In response to the Office Action mailed July 28, 2005, the Applicants respectfully request reconsideration of the pending claims based on the above amendments and the following remarks. The pending claims are believed to be in allowable condition.

As noted above, paragraphs 027, 032, 048, and 055 have been amended in the Specification. Claims 1, 5, 6, 7, 11, and 12 have also been amended and claims 2-3, 8-9, 13-15, and 17-18 have been canceled. The Specification has been amended to correct typographical errors and other informalities noted by the Examiner in the Office Action of July 28, 2005. Claims 1, 5, 6, 7, 11, and 12 have been amended to more particularly define embodiments of the present invention. Support for the claim amendments may be found in Figures 8-12 and in paragraphs 2 and 48-63 in the Specification. No new matter has been added by the amendments to the Specification and the claims.

Claims 1-18 are currently pending in the application. The disclosure in the Specification is objected to because of various informalities. Claims 3, 9, and 15 are rejected under 35 U.S.C. § 112, second paragraph. Claims 1-6 are rejected under 35 U.S.C. § 101. Claims 1-3, 7-9, and 13-15 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Cullick et al. (U.S. Patent 6,549,879, hereinafter "Cullick") in view of Brunet (U.S. Patent 6,315,054), and further in view of Tubel et al. (U.S. Patent 6,006,832). Claims 5-6, 11-12 and 17-18 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Cullick in view of Tubel, and further in view of Brunet and Lo et al. (U.S. Patent 5,757,663, hereinafter "Lo").

Specification

The disclosure is objected to because of various informalities in paragraphs 027, 032, 048, and 052. Since the language objected to paragraph 055 actually appears in paragraph 055, the objection to this paragraph will be addressed with respect to paragraph 052. In the above section entitled “Amendments to the Specification,” paragraphs 027, 032, 048, and 055 have been amended to correct the informalities. Based on the aforementioned amendments to the disclosure, it is respectfully submitted that the Examiner’s objection to the disclosure should be withdrawn.

Claim Rejections—35 U.S.C. §112, second paragraph

Claims 3, 9, and 15 are rejected as being indefinite. Claims 3, 9, and 15 have been canceled. Therefore, the rejections of claims 3, 9, and 15 under 35 U.S.C. §112, second paragraph should be withdrawn.

Claim Rejections—35 U.S.C. §101

Claims 1-6 are rejected for reciting a method that is not directed to the technological arts. Claims 2-4 have been canceled. As noted above in the section entitled “Amendments to the Claims,” claims 1 and 5-6 have been amended in conformity with the Examiner’s suggestions. Accordingly, the Examiner’s rejections of claims 1-6 should be withdrawn.

Claim Rejections—35 U.S.C. §103

Claims 1-3, 7-9 and 13-15 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Cullick in view of Brunet, and further in view of Tubel. As noted above, claims 2-3, 8-9, and 13-15 have been canceled. The rejection of the remaining claims is respectfully traversed.

Independent claim 1 has been amended to specify a computer implemented method of generating optimized platform locations for extracting hydrocarbons from underground reservoirs. The method includes the following steps: (1) computing a maximum number of targets to be assigned for each of a user-specified number of platforms by determining the product of a user-specified number of slots and a user-specified number of targets per slot; (2) selecting a possible set of platform locations from at least one of a number of X and Y coordinates from automatically generated target locations, a user-specified number of platform locations, or a generated grid of evenly spaced platform locations; (3) validating the set of possible platform locations to determine that each possible platform location in the set is in a geographically valid area by comparing each possible platform location against a set of exclusionary polygons; (4) determining a best set of platform locations from the set of possible platform locations by an iterative process which adds each of the possible platform locations to a list comprising the user-specified number of platforms and determining if the inclusion of each one of the possible platform locations in the list causes the total set of platforms to reach at least one of: more targets or the same number of targets with less total distance; and (5) optimizing each platform location in the best set of platform locations by an iterative process which determines whether an improvement is achieved by moving each of the platform locations within a fraction of a platform reach in eight compass directions around a current selected best platform location.

As discussed previously in Applicants' response of April 6, 2005, Cullick discloses a two-stage method for determining well locations in a 3D reservoir model. The first stage includes

determining well locations for vertical wells while the second stage includes determining well location for horizontal or deviated wells. In the first stage, a 3D-reservoir quality volume is used to generate a 2D quality map. Each cell in the 2D array may be considered as a potential site where a well can be drilled. The disclosed method includes selecting a subset of the potential locations that will maximize the cumulative value of reservoir property locations while ensuring that the planar distance between the selected sites is over a certain specified minimum to avert well interference. The second stage includes determining well trajectories that connect maximum reservoir pay values while honoring configuration constraints. In both stages, the method includes optimizing a static measure based on a proxy value such as porosity, net pay, permeability, permeability-thickness, or pore volume. See Col. 3, lines 47-67 through Col. 4, lines 1-12 and Col. 9, lines 4-59.

Cullick fails to teach, disclose, or suggest each of the features specified in amended independent claim 1. For example, Cullick fails to disclose generating optimized platform locations using an iterative process which includes determining a best set of platform locations based on a number of reachable targets. In particular, Cullick does not disclose adding possible platform locations to a list comprising a user-specified number of platforms and determining if the inclusion of the possible platform locations in the list causes the total set of platforms to reach more targets or the same number of targets with less total distance. Cullick also fails to disclose determining whether an improvement in the placement of platform locations is achieved by moving each of the platform locations within a fraction of a platform reach in eight compass directions around a current selected best platform location. In addition, Cullick also fails to

disclose validating a set of possible platform locations to determine that each possible platform location in the set is in a geographically valid area by comparing each possible platform location against a set of exclusionary polygons.

With respect to Brunet, as discussed in Applicants' previous response of April 6, 2005, Brunet is directed towards reducing the number of platform locations by creating a junction in a wellbore below the surface of the earth (Col. 2, lines 19-20, Fig. 4, and Col. 13, lines 45-54). Brunet, however, fails to teach, disclose, or suggest the features recited in amended independent claim 1, discussed above.

The Office Action also cites Tubel for allegedly teaching the determination of an optimum location for each platform location in the set of platform locations. As noted in the Office Action, Tubel teaches a set of platforms, each associated with a plurality of wells (See Fig. 1). Tubel, however, like Cullick and Brunet, fails to teach, disclose, or suggest the features recited in amended independent claim 1, discussed above.

Therefore, in view of the foregoing, amended independent claim 1 is allowable over Cullick, Brunet and Tubel, and the rejection of claim 1 should be withdrawn. Amended independent claim 7 specifies similar features as amended independent claim 1, discussed above. As discussed above, Cullick, Brunet and Tubel fail to teach, disclose, or suggest each of the features specified in amended independent claim 1. Therefore, in view of the foregoing, amended independent claim 7 is also allowable over Cullick, Brunet and Tubel, and the rejections of these claims should also be withdrawn.

The Office Action also cites Smitherman (U.S. Patent 5,975,207), Stinessen (U.S. Patent 5,398,72), Nish et al. (U.S. Patent Application 2003/0150618), and Middya (U.S. Patent application 2002/0165671). In particular, Smitherman is cited for the disclosure that a number of wells may be supported from a single platform and methods for reaching the furthermost areas of a production pay zone (Col. 1, lines 37-40 and Col. 2, lines 30-32), Stinessen is cited for the disclosure that the number of platforms necessary to drain hydrocarbons may be reduced with the aim of reducing costs (Col. 1, lines 58-60 and line 55), Nish et al. is cited for the disclosure that reducing the weight of risers and platforms facilitates reaching deep reserves (Para 0061, lines 1-10), and Middya is cited for the disclosure of the economic advantage in coupling a substantial number of wells for a plurality of different reservoirs to a single set of surface facilities (Para 0004, lines 16-18). However, none of the aforementioned references, alone or in combination, teaches, discloses, or suggests each of the features recited in amended independent claim 1, discussed above. For example, none of the aforementioned references discloses the following features: validating the set of possible platform locations to determine that each possible platform location in the set is in a geographically valid area by comparing each possible platform location against a set of exclusionary polygons, determining a best set of platform locations from the set of possible platform locations by an iterative process which adds each of the possible platform locations to a list comprising the user-specified number of platforms and determining if the inclusion of each one of the possible platform locations in the list causes the total set of platforms to reach at least one of: more targets or the same number of targets with less total distance, and optimizing each platform location in the best set of platform locations by an

iterative process which determines whether an improvement is achieved by moving each of the platform locations within a fraction of a platform reach in eight compass directions around a current selected best platform location. Therefore, in view of the foregoing, amended independent claims 1 and 7 are also allowable over Smitherman, Stinessen, Nish et al., and Middya.

Claims 5-6, 11-12, and 17-18 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Cullick in view of Brunet, and further in view of Tubel and Lo. As noted above, claims 17-18 have been canceled. The rejection of the remaining claims is respectfully traversed.

Amended claims 5-6 and 11-12 depend from amended independent claims 1 and 7 respectively and thus include at least the same features as claims 1 and 7 as well as the additional features set forth therein. For example, amended claims 5 and 11 specify that optimizing platform locations includes the following steps: (a) setting an initial step-out distance equal to the fraction of the platform reach; (b) selecting a potential new platform location located the step-out distance from the original platform location in one of the eight compass directions; (c) validating the potential new platform location; (d) computing at least one of the number of targets that could be reached from the potential new platform location or the total drilling distance to reach all the targets to be reached from the potential new platform location; (e) comparing the computed number of targets that could be reached from the potential new platform location or the total drilling distance to reach all the targets to be reached from the potential new platform location against the values at the original platform location; (f) determining that the potential new platform location is better than the original location based on at least one of the following: more targets may be reached

from the potential new platform location than from the original platform location and the same number of targets may be reached from the potential new platform location with less drilling distance than from the original platform location; (g) moving the original platform location to the potential new platform location; (h) executing steps (b) to (g) for other compass directions; and (i) executing steps (b) through (h) by progressively decreasing the step-out distance until a more desirable platform location is no longer achieved.

As discussed above, Cullick, Brunet, and Tubel all fail to teach, disclose or suggest each of the features specified in claims 1 and 7. Lo, relied upon to cure the deficiencies of the aforementioned references, also fails teach any of the features of claims 1 and 7. Lo merely teaches a method and computer software system for identifying and quantifying connectivity of regions within subsurface reservoir formations, thereby enabling an estimate of the connected reservoir volume of hydrocarbons available for commercial recovery (Col. 2, lines 54-60). Therefore, claims 5-6 and 11-12 are allowable based at least on their dependency on amended independent claims 1 and 7, discussed above, and the rejections of these claims should be withdrawn.

Conclusion

In view of the foregoing amendments and remarks, this application is now believed to be in a condition for allowance. A notice to this effect is respectfully requested. If the Examiner believes, after this amendment, that the application is not in condition for allowance, the Examiner is invited to call directly Applicants' attorney at the number listed below.

If any additional fees are required for the timely consideration of this application, please charge Deposit Account Number 13-2725.

Respectfully submitted,

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